displayed by the oximeter and cardioscope corresponded. An appropriate size blood pressure cuff connected to a mercury manometer was placed on same arm. The cuff was manually inflated in 2–5-mmHg increments till the plethysmographic waveform disappeared and the reading recorded. The cuff was then inflated to 250 mmHg and gradually deflated until the waveform reappeared on the oximeter and the monometer reading recorded at this point. The average of the two recordings was taken as systolic blood pressure in the upper arm.

This technique to measure the systolic blood pressure was adopted in the intra-operative and postoperative periods.

A 45-year-old male, known to have aorto-arteritis presented to the ICU in grade IV coma and with irregular breathing (rate 44/minute). All the peripheral pulses and left carotid pulse were absent. Therefore, measurement of systolic blood pressure by conventional techniques was not possible. Management included ventilatory support and general supportive care. The pulse oximeter was used to monitor systolic blood pressure (as described above) during his 9-day stay in the ICU.

It is technically difficult to obtain reliable estimates of systolic blood pressure in these patients. Ramanathan *et al.*[1] observed a pulsatile blood flow in clinically nonpulsatile arteries in patients with Takayasu's syndrome. We too observed the plethysmographic waveform on the oximeter in the limbs with weak or absent pulses.

Guru Teg Bahadur Hospital, Shardara, Delhi, India

R. CHAWLA
V. KUMARVEL
K.K. GIRDHAR
A.K. SETHI
A. BHATTACHARYA

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Noncardiogenic pulmonary oedema after attempted suicide by hanging

Acute pulmonary oedema after an attempted suicide by hanging was reported earlier,[1] but it was not defined by the recent diagnostic criteria for adult respiratory distress syndrome (ARDS).[2] This is a case report of a patient who could not be saved despite best possible supportive care and monitoring where these criteria were used.

A 25-year-old woman was brought to the casualty department of our Institute within 25 minutes of rescue by her family from an attempted suicide by hanging. The exact duration of hanging was not known. She was unconscious with normal sized pupils that were sluggishly reacting to light. There was dusky cyanosis in the peripheries; her respiratory rate was 22/minute. Her arterial blood pressure was 80/60 mmHg and her heart rate 140 beats/minute. There was no evidence of upper airway obstruction but there were crepitations at both lung bases. There was an ecchymotic mark over the anterior aspect of the neck. Her trachea was inbutated with a 7.5-sized Portex cuffed nasotracheal tube and manual ventilation of the lungs was started with an Ambu bag with 100% oxygen. This resuscitation improved her arterial blood pressure to 110/70 mmHg. The patient was transferred to the respiratory intensive care unit (RICU) and connected to a Cape 2600 intensive care ventilator with FIO_2 of 1.0. Pink frothy secretions were observed through the transparent tracheal tube within a few minutes. The airway pressure was 4.5 kPa. Hypoxaemia (PaO_2 5.7 kPa) and metabolic acidosis was demonstrated on arterial blood gas analysis (sample 1). Furosemide 60 mg, 100 mmol $NaHCO_3$ were given intravenously and 1.0 kPa PEEP was applied. Improvement (sample 2) resulted. A chest radiograph showed pulmonary oedema with densities in all four lung quadrants. A radiograph of the neck was normal. A bedside two-dimensional echocardiograph revealed normal ventricular size, normal sized pulmonary veins, fair left ventricular function and normal valves. 12-lead electrocardiography (ECG) revealed sinus tachycardia. Four hours after admission to RICU, there was systolic hypotension (70 mmHg) which failed to respond to a fluid challenge. PEEP was deceased to 0.6 kPa and a dopamine infusion was commenced at a rate of (5 μg/kg)/minute which resulted in improvement of systolic pressure to 110 mmHg. The patient regained consciousness the next morning (approximately 8 hours after admission to RICU) with no apparent neurological deficit. She continued to receive dopamine infusion at a rate of 5 to 8 (μg/kg)/minute to maintain her systolic blood pressure between 90 to 100 mmHg. The chest X ray was not changed. Arterial PaO_2 ranged between 22 and 24 kPa (samples 4, 5 and 6) with an FIO_2 of 0.8 and PEEP 0.6 kPa. Cardiac arrest occurred on the morning of the third day from when she was resuscitated. The FIO_2 was increased to 1 and dopamine infusion rate to 12 (μg/kg)/minute after this episode. Sample 7 (after cardiac arrest) revealed a PaO_2 of 8.3 kPa. Bedside two-dimensional echocardiography again showed no regional wall motion abnormalities, mild diastolic dysfunction, normal function of the valves, and overall good left ventricular function. Sinus tachycardia continued. PEEP was increased to 1.0 kPa since an FIO_2 1.0 had failed to improve arterial oxygenation (sample 8). Severe pulmonary oedema persisted on X ray. She was resuscitated after five more episodes of cardiac arrest, but she succumbed on the sixth occasion. Monitoring during management in RICU consisted of continuous ECG, direct arterial blood pressure, inspired oxygen concentration, end tidal CO_2, central venous pressure and urine output monitoring. Intravenous fluids (crystalloids) were administered according to CVP, arterial blood pressure and urine output.

This case illustrates the occurrence of ARDS after an attempted suicide by hanging. The recent expanded criteria[2] for ARDS using chest X ray, hypoxaemia and PEEP scores were used (see Table). Cardiac failure was excluded by use of bedside two-dimensional echocardiography.

The pathogenesis of pulmonary oedema appears to be similar to that after relief of acute airway obstruction.[3] Acute upper airway obstruction during hanging results in a large increase in subatmospheric pressure which may be transmitted to the interstitial peribronchial and perivascular spaces; this disrupts the integrity of the pulmonary capillaries. The high subatmospheric transpulmonary pressure would enhance venous return, while simultaneously fluid therapy would increase the preload and consequently the pulmonary vascular pressure. These cardiovascular haemodynamics are opposed during expiration by the relatively high positive transpulmonary pressure. The expiratory component of acute upper airway obstruction thus acts as a form of retard, akin to PEEP, which exerts a protective effect in the patient. The haemodynamic consequences produced by an abrupt

Table 1. Arterial blood gas analysis and lung injury scores.

Sample	Time	F_{IO_2}	PEEP kPa	pH	P_{aO_2} kPa	P_{aCO_2} kPa	Base excess mmol/litre	Saturation %	X ray score	Hypoxaemia score	PEEP score	Lung injury score
1	Day 1	1	—	7.2	5.7	5.3	−7.5	71	—	—	—	—
2	Day 1	1	10	7.37	27.9	4.0	−9	99.6	4	2	2	2.6
3	Day 1	1	6	7.5	29.0	3.6	1.5	99.6	—	—	—	—
4	Day 2	0.8	6	7.4	23.4	4.5	1	99.6	4	2	1	2.3
5	Day 2	0.8	6	7.4	22.6	4.5	−0.7	99.5	—	—	—	—
6	Day 2	0.8	6	7.4	23.9	4.0	0	99.5	—	—	—	—
7	Day 3	0.8	6	7.0	8.4	7.6	−14	85.1	—	—	—	—
8	Day 3	1	6	7.3	6.2	5.7	−5	71	4	4	1	3
9	Day 3	1	10	7.3	11.8	4.9	−7.1	95	4	4	2	3.3

Chest X ray score, a score of 4 is given if alveolar consolidation is present in all four quadrants.
Hypoxaemia score, a score of 2 is given if P_{aO_2}/F_{IO_2} ratio is 175 to 224 and 4 when it is less than 100.
PEEP score, a score of 1 is given if PEEP applied is 0.6–0.8 kPa and 2, if it is 0.9–1.1 kPa.
ARDS is diagnosed when lung injury score (obtained by dividing the aggregate sum by the number of components (3)) exceeds 2.5; mild to moderate lung injury is said to be present if the score ranges from 0.1 to 2.5.[3]

decrease in airway pressure, caused by relief of acute airway obstruction without a positive expiratory pressure, might produce a sudden increase in venous return due to an acute redistribution of intravascular volume from periphery to pulmonary circulation. The resultant acute increase in the pulmonary hydrostatic pressure, in the presence of damaged pulmonary microcvasculature, leads to pulmonary oedema. Acute hypoxaemia and excessive sympathetic discharge may also contribute.

Nizam's Institute of Medical Sciences,
Panjagutta,
Hyderbad, 500-482,
Andhra Pradesh,
India

S. MANTHA
S.M. RAO

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In Table 1 in this letter, PEEP values given as 10 and 6 should be 1.0 and 0.6 respectively.

Pre-induction behaviour in children

We read with interest the article which reviewed the use of sedatives as preliminary medication for paediatric surgery (*Anaesthesia* 1990; **45:** 427–35) by Morgan-Hughes and Bangham. Their article does not aim to present preparation before operation other than the administration of sedatives, but we think that drowsiness or sleeping before anaesthesia is not usually necessary. Psychological preparation is more important and the emphasis should be on pre-induction calmness.

We aim specifically to have a calm, but awake and cooperative child, before anaesthesia in a child aged more than 3 years. Our technique involves the use of small doses of oral diazepam (0.2–0.3 mg/kg), but with much emphasis on psychological preparation of the child and parents. The child and parents are seen on the day before surgery and a rapport set up with the child. An in-depth knowledge of children's television and magazine characters is helpful, plus an ability to talk with enthusiasm about the child's interests. In conversation with the child the anaesthetists's sympathetic and friendly attitude is projected so that his or her face and voice is remembered. The parents are allowed to gain confidence in the anaesthetist, particularly by the anaesthetist showing them that their child is an important patient. An unhurried attitude is necessary.

The drawing of a picture by the child is discussed and a topic for the picture decided. The child, often full of enthusiasm, will bring a picture that has been drawn the previous afternoon or evening to theatre to show the anaesthetist. However, the main use of drawing is to occupy the child whilst he or she waits to be anaesthetised. Crayons, paper and a clip board are available in the children's theatre and the child draws a picture of choice, which then joins the many others hanging on the anaesthetic room wall. The child will go into a world of imagination virtually oblivious to the threatening environment of the anaesthetic room.

EMLA cream is placed on the nondominant hand 90 minutes before surgery and an intravenous cannula can often be sited whilst the child continues drawing. The presence of a parent in the anaesthetic room is almost mandatory with the younger child. The child will sometimes cry after insertion of the cannula, but will usually be calm up to this point.

The main ingredients for success are a sympathetic child-orientated anaesthetist, a relaxed parent, an awake and enthusiastic child, a mild anxiolytic, although probably with little pharmacological effect and EMLA cream. The results are not perfect, but generally lead to an enjoyable day for the anaesthetist and theatre staff and hopefully an undisturbed child and parents.

Cambridge Military Hospital,
Aldershot GU11 2AN

T.A. BEDFORD
M.C. THOMPSON